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CIA

Recd 24 Sept 74

From [redacted]

MEMORANDUM FOR THE RECORD

SUBJECT: OSI Assessment of Progress in the S&T Bilateral Agreement Project on Energy: Development of Commercial Scale, Open Cycle MHD Power Plants

1. The initial estimate of Soviet capabilities in the MHD field prepared in November 1972 has been supported in general by information gained since then during the course of the US-USSR exchange. No significant new technical knowledge has been obtained as a result of this exchange, but the US has become much more familiar with the capabilities of the Soviet U-02 and U-25 MHD generators. This information probably would not have become available without the exchange.

2. Current Assessment of Benefits and Disadvantages to the US:

A. The quid pro quo from this exchange appears to be fairly even. The main benefit to the US will probably be in the money saved in not having to build a large pilot MHD plant needed to test a channel. Such a plant should have been built in the US several years ago but was not. In this exchange the US will have access to a USSR plant for test purposes.

B. Although the Soviets may think they have a lot to offer the US in materials for MHD ducts, they may be surprised at some of the recent results of the US MHD materials effort just getting underway. As a result of this effort, direct coal combustion may prove to be the easiest route to practical MHD power generation instead of the "clean fuel" route the Soviets have chosen.

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C. There is some question as to whether development of an MHD generator capability is necessary and practical for the US in the area of commercial power production. The US has the technical capability of manufacturing and maintaining advanced gas turbines on a large scale whereas the Soviets do not. While the level of maintenance for an MHD generator is not as stringent, demanding and precise as it is for a gas turbine, MHD generators may need more servicing than gas turbines. In any economy such as that of the USSR obtaining help for servicing a labor intensive device such as an MHD generator would not present as much of a problem as it would in the US or Western Europe.

3. USSR Goals in this Exchange:

The Soviets are eager to get the U-25 working, i.e., to get an output of 12 to 15 MWe for at least an hour, so they will assure ample funding in the next Five-Year Plan to carry on MHD R&D as they have in the past.

4. Areas of Cooperation the US Side Might Propose to Make this Activity of Greater Benefit to the US:

A. The US might press for an exchange of information on closed-cycle MHD. Recently the Soviets have been quite uncommunicative about their efforts in this area. All US work in close-cycle MHD has been published in the open literature. It would be useful to determine whether we are correct in our assumption that US work in this area is more advanced than that of the Soviets.

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B. There have been some reports in the open literature of a Soviet pulsed MHD device to aid in predicting earthquakes. This suggests a good MHD capability according to the best estimates we can make with the information at hand. Accordingly, the US might want to tie in with the MHD workers at the Institute of Atomic Energy at Krasnaya Pakhra where this generator was developed. This might be very difficult to do, however, given the bureaucratic composition of MHD R&D in the USSR.